UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,841	04/12/2004	Kenji Maruyama	107317-00064	1726

7590 04/01/2005

ARENT FOX PLLC
SUITE 400
1050 CONNECTICUT AVENUE, N.W.
WASHINGTON, DC 20036-5339

EXAMINER	
KENNEDY, JENNIFER M	
ART UNIT	PAPER NUMBER
2812	

DATE MAILED: 04/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/821,841	MARUYAMA ET AL.	
	Examiner	Art Unit	
	Jennifer M. Kennedy	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/04, 7/04, 9/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 11-14 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Summerfelt (U.S. Patent No. 6,117,689) in view of Noguchi et al. (U.S. Patent No. 6,258,459).

Summerfelt discloses the method of preparing an amorphous layer (SOI substrate; see column 11, lines 40-41), forming a MgO layer (34, see column 11,lines 40-45) on the amorphous layer, forming a ReO_3 layer (98, see column 11, lines 20-40) and forming an oxide ferroelectric layer having a perovskite structure (36, see column 12, lines 28-43) on said ReO_3 layer.

Summerfelt does not disclose the crystal orientation of the layers are (001). Noguchi et al. disclose the method of forming a ferroelectric capacitor, having the laminated layers all oriented in the same direction and states that (001) orientation is preferred (see column 1, lines 51-54, column 2, lines 27-30 and column 6, lines 54-55). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the layers of Summerfelt of the orientation of Noguchi et al. because as Noguchi et al. teach the orientation provides for superior performance (see column 1, lines 51-54).

In re claim 19, Summerfelt discloses the method wherein the bottom electrode is formed by sputtering (see column 7, lines 45-50 and column 11,lines 19-30).

In re claim 20, Summerfelt disclose the method further comprising forming an upper electrode layer on the oxide ferroelectric layer (44).

Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Summerfelt (U.S. Patent No. 6,117,689) and Noguchi et al. (U.S. Patent No. 6,258,459) in view of Buskirk et al. ("Common and Unique Aspects of Perovskite Thin Film CVD Processes", provided in IDS).

In re claims 15, and 17-18, Summerfelt and Noguchi et al. disclose the method as claimed and rejected above, but do not disclose the method of forming one of the MgO, ReO3 and ferroelectric by MOCVD, at a substrate temperature of 620°C or lower (see page 279-280), and wherein the MOCVD using an organometal raw material, DPM, or I-PrO. Buskirk et al. disclose the method of forming the ferroelectric by MOCVD at a substrate temperature of 620°C or lower, and wherein the MOCVD using an organometal raw material, DPM, or I-PrO (see page 277). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the ferroelectric film of Summerfelt with these condition because as Buskirk et al. teaches, the method including the low temperature CVD allow for highly conformal films (see page 280) and simplifies the formation by the absence of competing crystalline phases.

In re claim 16, Summerfelt, Noguchi et al. and Buskirk et al. do not disclose the method of forming the MgO and ReO_3 by MOCVD. The examiner takes official notice of facts outside the record which are capable of instant and unquestionable demonstration

as being "well-known" in the art. The examiner notes that MOCVD is a well known process of forming a metal oxide. It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the MgO and ReO_3 by MOCVD since the method is well known and used in the art to form metal oxides with good conformality and would allow for the same MOCVD equipment for the deposition of the ferroelectric to be used for the additional layers reducing capital costs.

Claims 11-13, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klee et al. (U.S. Patent No. 5,995,359) in view of Noguchi et al. (U.S. Patent No. 6,258,459).

In re claim 11-13, Klee et al. disclose the method of forming a MgO layer (34, see column 11,lines 40-45), forming a ReO_3 layer and forming an oxide ferroelectric layer having a perovskite structure on said ReO_3 layer (see column 2, lines 25-34, column 3, lines 51-55, column 5, lines 40-60).

Klee et al. do not disclose the crystal orientation of the layers are (001). Noguchi et al. disclose the method of forming a ferroelectric capacitor, having the laminated layers all oriented in the same direction and states that (001) orientation is preferred (see column 1, lines 51-54, column 2, lines 27-30 and column 6, lines 54-55). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the layers of Klee et al. of the orientation of Noguchi et al. because as Noguchi

et al. teach the orientation provides for superior performance (see column 1, lines 51-54).

In re claim 20, Klee et al. disclose the method further comprising forming an upper electrode layer on the oxide ferroelectric layer (see column 6, lines 1-5).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Kennedy whose telephone number is (571) 272-1672. The examiner can normally be reached on Mon.-Fri. 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer M. Kennedy
Patent Examiner
Art Unit 2812

jmk